

# Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/US05/006898

International filing date: 03 March 2005 (03.03.2005)

Document type: Certified copy of priority document

Document details: Country/Office: US  
Number: 60/549,822  
Filing date: 03 March 2004 (03.03.2004)

Date of receipt at the International Bureau: 31 March 2005 (31.03.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland  
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

1297392

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

*March 17, 2005*

**THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.**

**APPLICATION NUMBER: 60/549,822**

**FILING DATE: *March 03, 2004***

**RELATED PCT APPLICATION NUMBER: *PCT/US05/06898***



Certified by

Under Secretary of Commerce  
for Intellectual Property  
and Director of the United States  
Patent and Trademark Office

030304

16569 U.S. PTO

PTO/SB/16 (01-04)

Approved for use through 07/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**PROVISIONAL APPLICATION FOR PATENT COVER SHEET**

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. ER 613887435 US

19249 U.S. PTO  
60/549822

030304

INVENTOR(S)					
Given Name (first and middle (if any))		Family Name or Surname		Residence (City and either State or Foreign Country)	
Larry C.		Smyth		Charlotte, North Carolina	
Additional inventors are being named on the _____ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (500 characters max)					
MARK SCANNING METHOD					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
<input checked="" type="checkbox"/> Customer Number:		36829			
OR					
<input type="checkbox"/> Firm or Individual Name					
Address					
Address					
City		State		Zip	
Country		Telephone		Fax	
ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification Number of Pages 4		<input type="checkbox"/> CD(s), Number _____			
<input type="checkbox"/> Drawing(s) Number of Sheets _____		<input type="checkbox"/> Other (specify) _____			
<input checked="" type="checkbox"/> Application Data Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT					
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.				FILING FEE Amount (\$)	
<input checked="" type="checkbox"/> A check or money order is enclosed to cover the filing fees.				80.00	
<input checked="" type="checkbox"/> The Director is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 50-2716					
<input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.					
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input checked="" type="checkbox"/> No.					
<input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are: _____					

Respectfully submitted,

[Page 1 of 2]

Date March 3 2004

SIGNATURE

REGISTRATION NO. 37,532

TYPED or PRINTED NAME Jeffrey J. Schwartz

(if appropriate)

Docket Number: 138/9

TELEPHONE 704/552-1889

**USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT**

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop Provisional Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

## MARK SCANNING METHOD

### Technical Field and Background of the Invention

This invention relates to a mark scanning method. The invention offers a novel distinct solution for tracking parts through their manufacturing stages, and in particular for automated tracking.

It is important that many products are traceable back to and through manufacturing. Thus, for example, if a safety-critical defect is detected in a particular item, then products with the same history can be identified and tracked down to minimize damage and liability. As such, it is essential that many products be permanently marked in such a manner that manufacturing records for the product can be retrieved for analysis at an unknown future time. For example, aluminum wheels are a primary structural component of an automobile that require full tracability for safety reasons.

The need for automated rapid identification of general products has led to information encoded as 1-D bar codes for machine reading. These all-pervasive linear barcodes are typically high contrast marks, most often black bars on a white background to facilitate reliable and rapid scanning and decoding. When low contrast barcodes are used they generally are unreliable with conventional scanners. A solution used to overcome the low contrast issue is to use a particular type of 2-D barcode, where the bars are either below or above the general surface. Then, by using more sophisticated scanners based on laser distant measurement units, these codes can reliably read. This type of 2-D barcode is called a "bumpy bar code" by some ([www.bumpybarcode.com](http://www.bumpybarcode.com)).

There is a second, more common form of 2-D barcodes used for marking product, although they are not cast or formed in. Unlike bumpy bar code, the code is marked in one flat plane, more or less as conventional linear barcodes are. This type of 2-D area barcode offers the ability to provide very dense information coding, as well as redundant information and error correction if the code is damaged. There are a number of such codes, with 2-D Data Matrix being one of the more common. One disadvantage of such codes is they require more sophisticated scanners, although this is not much of an issue for high contrast codes.

Direct part marking (DPM) is often the lowest cost of marking products, as there are little to no marking expendables, unlike labeling or tagging. It is becoming more common that 2-D Data Matrix like codes are formed by DPM processes. While such laser formed marks are more or less 2-D, interestingly, peened marks are actually 3-D marks. Either way, low contrast is often encountered, and such marks can only be scanned satisfactorily when special contrast enhancing lighting and narrow field of views are practiced.

#### Object of Invention

Therefore, it is an object of the invention to create a method to scan a 3-D mark made in a part by DPM processes, and one that greatly relaxes the rigid lighting requirements of present machine vision systems.

#### Description of the Preferred Embodiment and Best Mode

Laser distance measurements systems are commonly used to precisely measure the distance between a point of interest and the sensor. Basically, a

very narrow beam of collimated light is projected onto the point of interest and reflected light hits a linear light detector array where the output signal is proportional to the distance to the object. Such single laser distance measurement sensors can be scanned across a surface to get a 2-D map of a surface. By moving the surface past such a scanner, a 3-D surface map can be obtained. For example, this technology is used in tire inspection to search for out of specification bulging in the tire sidewall.

Laser beams can also be projected as a line and the reflected light gathered in a light detector area array. With this technology it is possible to measure a limited 2-D surface without any raster scanning. Moving the surface relative to such a static line scanner then produces a 3-D surface image. On a multiple order of magnitudes larger scale, aircraft radar does a similar task using a different physical phenomenon.

By taking a laser distance map of a surface that has an area matrix coding peened or otherwise formed into the surface, it is possible for a person to see the surface and coding in difficult lighting conditions. Since the background surface that has the peened DPM code formed into it is dominant, it is a straightforward task to subtract it from the overall surface map to yield the 2-D dot matrix for decoding processing.

Thus, the invention is micro mapping of a surface that contains an area code that is formed into the surface, determining the general background surface and then subtracting it to reveal the coded mark, and then processing it to determine the part identification and any other data encoded.

A mark scanning method is described above. Various details of the invention may be changed without departing from its scope. Furthermore, the foregoing description of the preferred embodiment of the invention and best mode for practicing the invention are provided for the purpose of illustration only and not for the purpose of limitation.

**Inventor Information**

Inventor One Given Name:: Larry C.  
Inventor One Family Name:: Smyth  
Postal Address Line One:: 16108 River Point Drive  
City:: Charlotte  
State:: North Carolina  
Zip Code:: 28278  
Country:: US  
Citizenship Country: US

**Correspondence Information**

Name Line One:: Schwartz Law Firm, P.C.  
Address Line One:: SouthPark Towers  
Address Line Two:: 6100 Fairview Road  
Address Line Three: Suite 530  
City:: Charlotte  
State: North Carolina  
Zip Code:: 28210  
Country:: US  
Telephone:: 704/552-1889  
Facsimile:: 704/552-1866  
E-Mail:: jjs@schwartz-iplaw.com

**Application Information**

Title Line One:: MARK SCANNING METHOD  
Total Drawing Sheets:: 0  
Formal Drawings?: No  
Application Type:: Provisional  
Docket Number:: 138/9

**Representative Information**

Registration Number One:: 37,532